

**ABSTRACT:**

An apparatus for carrying out a multi-step process of converting hydrocarbon fuel to a substantially pure hydrogen gas feed includes a plurality of modules each module being in fluid communication with adjacent modules. The modules may be arranged axially along a common axis of flow or alternatively the modules are arranged along a common axis so that they are nested one within the other. The multi-step process includes: providing a fuel processor having a plurality of modules; and feeding the hydrocarbon fuel successively through each of the modules in the reactor to produce the hydrogen rich gas.